USER'S MANUAL

KNIGHT ONLINE SERIES

UPS

220V

1000 (L) / 2000 (L) / 3000 (L)

Uninterruptible Power Supply System

Contents

1. SAFETY WARNING 2

1-1. TRANSPORTATION 2
1-2. PREPARATION 2
1-3. INSTALLATION 2
1-4. OPERATION 2
1-5. MAINTENANCE, SERVICE AND FAUILTS 3

2. INSTALLATION AND SETUP 4

2-1. REAR PANEL VIEW 4
2-2. SINGLE UPS INSTALLATION 5
2-3. SOFTWARE INSTALLATION 7

3. OPERATIONS 8

3-1. LCD PANEL 8
3-2. BUTTON OPERATION 8
3-3. LED INDICATORS AND LCD PANEL 10
3-4. AUDIBLE ALARM 110
3-5. SINGLE UPS OEPRATION 131
3-6. LCD DISPLAY WORDINGS INDEX 143
3-7. LCD MAIN INTERFACE 14
3-8. OPERATING MODE DESCRIPTION 20
3-9. FAULT CODE 20
3-10. WARNING INDICATOR 211

4. TROUBLE SHOOTING 21

5. STORAGE AND MAINTENANCE 24

6. SPECIFICATIONS 25

1. Safety Warning

Please comply with all warnings and operating instructions in this manual strictly. Save this manual properly and read carefully the following instructions before installing the unit. Do not operate this unit before reading through all safety information and operating instructions carefully

1-1. Transportation

- Please transport the UPS system only in the original package to protect against shock and impact.

1-2. Preparation

- Condensation may occur if the UPS system is moved directly from cold to warm environment. The UPS system must be absolutely dry before being installed. Please allow at least two hours for the UPS system to acclimate the environment.
- Do not install the UPS system near water or in moist environments.
- Do not install the UPS system where it would be exposed to direct sunlight or near heater.
- Do not block ventilation holes in the UPS housing.

1-3. Installation

- Do not connect appliances or devices which would overload the UPS system (e.g. laser printers) to the UPS output sockets.
- Place cables in such a way that no one can step on or trip over them.
- Do not connect domestic appliances such as hair dryers to UPS output sockets.
- The UPS can be operated by any individuals with no previous experience.
- Connect the UPS system only to an earthed shockproof outlet which must be easily accessible and close to the UPS system.
- Please use only VDE-tested, CE-marked mains cable (e.g. the mains cable of your computer) to connect the UPS system to the building wiring outlet (shockproof outlet).
- Please use only VDE-tested, CE-marked power cables to connect the loads to the UPS system.
- When installing the equipment, it should ensure that the sum of the leakage current of the UPS and the connected devices does not exceed 3.5mA.

1-4. Operation

- Do not disconnect the mains cable on the UPS system or the building wiring outlet (shockproof socket outlet) during operations since this would cancel the protective earthing of the UPS system and of all connected loads.
- The UPS system features its own, internal current source (batteries). The UPS output sockets or output terminals block may be electrically live even if the UPS system is not connected to the building wiring outlet.
- In order to fully disconnect the UPS system, first press the OFF/Enter button to disconnect the mains.
- Prevent no fluids or other foreign objects from inside of the UPS system.

1-5. Maintenance, service and faults

- The UPS system operates with hazardous voltages. Repairs may be carried out only by qualified maintenance personnel.
- **Caution -** risk of electric shock. Even after the unit is disconnected from the mains (building wiring outlet), components inside the UPS system are still connected to the battery and electrically live and dangerous.
- Before carrying out any kind of service and/or maintenance, disconnect the batteries and verify that no current is present and no hazardous voltage exists in the terminals of high capability capacitor such as BUS-capacitors.
- Only persons are adequately familiar with batteries and with the required precautionary measures may replace batteries and supervise operations. Unauthorized persons must be kept well away from the batteries.

Caution - risk of electric shock. The battery circuit is not isolated from the input voltage. Hazardous voltages may occur between the battery terminals and the ground. Before touching, please verify that no voltage is present!

- Batteries may cause electric shock and have a high short-circuit current. Please take the precautionary measures specified below and any other measures necessary when working with batteries:
  - remove wristwatches, rings and other metal objects
  - use only tools with insulated grips and handles.
- When changing batteries, install the same number and same type of batteries.
- Do not attempt to dispose of batteries by burning them. This could cause battery explosion.
- Do not open or destroy batteries. Escaping electrolyte can cause injury to the skin and eyes. It may be toxic.
- Please replace the fuse only with the same type and amperage in order to avoid fire hazards.
- Do not dismantle the UPS system.

2. Installation and set up

NOTE: Before installation, please inspect the unit. Be sure that nothing inside the package is damaged. Please keep the original package in a safe place for future use.

NOTE: There are two different types of online UPS: standard and long-time models. Please refer to the following model table.

Model	Type	Model	Type
6K(R)	Standard	6K(R)L	Long-time
10K(R)		10K(R)L	

2-1. Rear Panel View

Diagram1 : 6K/10K Rear Panel

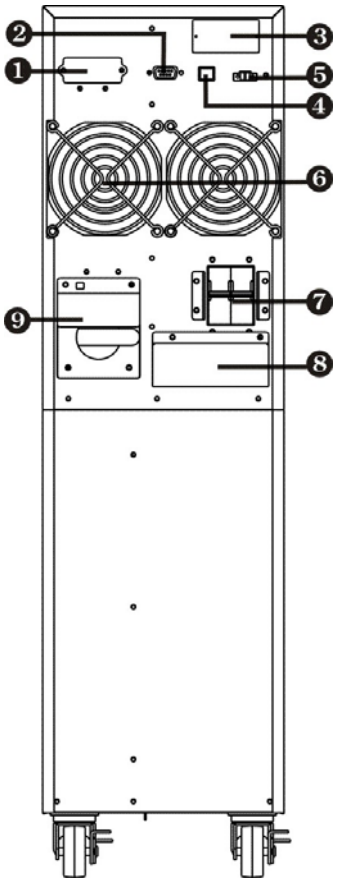
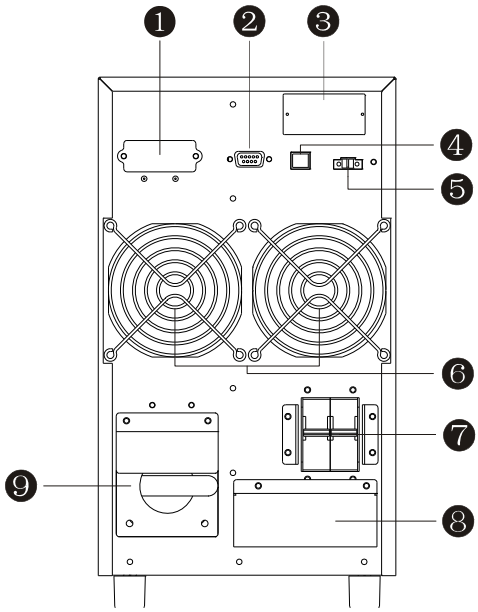


Diagram 2 : 6K(L)/10K(L) Rear Panel

Diagram 3 : 6K(L)/10K(L) Input/Output Terminal



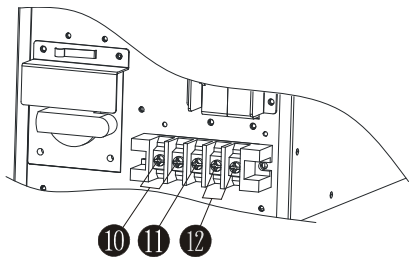


Diagram 4 : 6K(L)/10K(L) Rear Panel

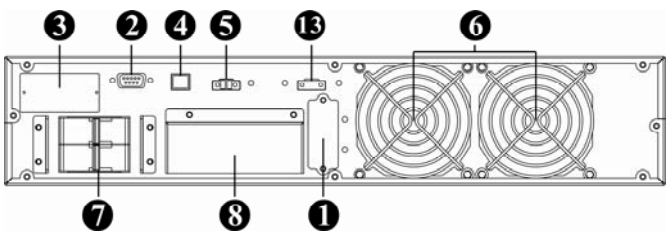


Diagram 5 : Rack Input/Output Terminal

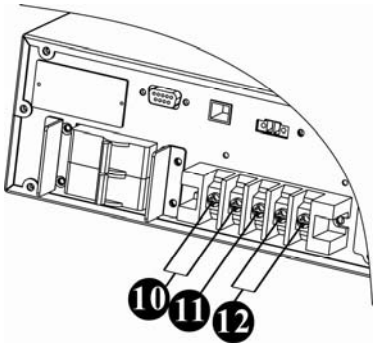
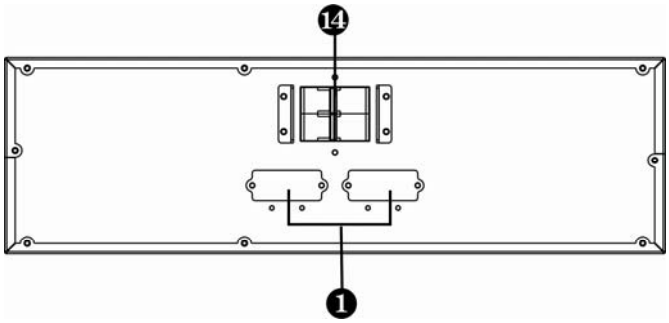


Diagram 6 : Rack Battery Pack Rear Panel



1. External battery connector
2. RS-232 communication port
3. Intelligent slot
4. USB communication
5. Emergency power off function connector (EPO connector)
6. Cooling fan
7. Input circuit breaker
8. Input/Output terminal (Refer to Diagram 3 and 5 for the details)
9. Maintenance bypass switch
10. Output terminal
11. Grounding terminal
12. Utility input terminal
13. External maintenance bypass switch port
14. Battery pack output circuit breaker

2-2. Single UPS Installation

Installation and wiring must be performed in accordance with the local electric laws/regulations and execute the following instructions by professional personnel.

1) Make sure the mains wire and breakers in the building are in compliance with the standard of rated capacity of UPS to avoid the hazards of electric shock or fire.

NOTE: Do not use the wall receptacle as the input power source for the UPS, as its rated current is less than the UPS's maximum input current. Otherwise the receptacle may be burned and destroyed.

2) Switch off the mains switch in the building before installation.

3) Turn off all the connected devices before connecting to the UPS.

4) Prepare wires based on the following table:

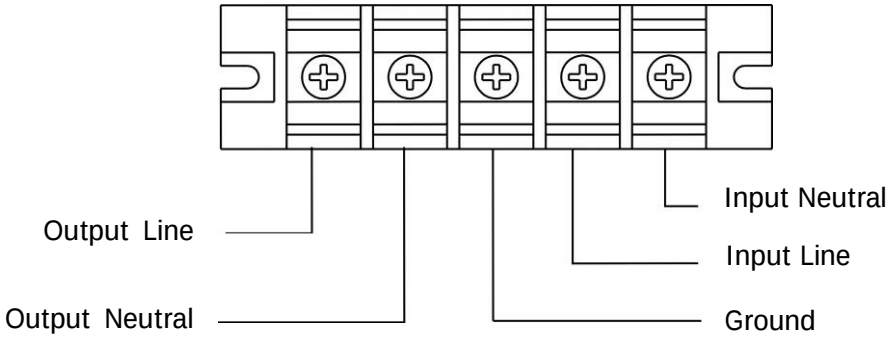
Model	Wiring spec (AWG)			
	Input	Output	Battery	Ground
6K	10	10		10
6KL	10	10	10	10
10K	8	8		8
10KL	8	8	8	8

NOTE 1: The cable for 6K/6KL should be able to withstand over 50A current. It is recommended to use 10AWG or thicker wire for safety and efficiency.

NOTE 2: The cable for 10K/10KL should be able to withstand over 63A current. It is recommended to use 8AWG or thicker wire for safety and efficiency.

NOTE 3: The selections for color of wires should be followed by the local electrical laws and regulations.

5) Remove the terminal block cover on the rear panel of UPS. Then connect the wires according to the following terminal block diagrams: (Connect the earth wire first when making wire connection. Disconnect the earth wire last when making wire disconnection!)



Terminal Block wiring diagram for 6K(L)/10K(L)

NOTE 1: Make sure that the wires are connected tightly with the terminals.

NOTE 2: Please install the output breaker between the output terminal and the load, and the breaker should be qualified with leakage current protective function if necessary.

6) Put the terminal block cover back to the rear panel of the UPS.

Warning: (Only for standard model)

- Make sure the UPS is not turned on before installation. The UPS should not be turned on during wiring connection.
- Do not try to modify the standard model to the long-run model. Particularly, do not try to connect the standard internal battery to the external battery. The battery type and voltage and numbers may be different. If you connect them together, it maybe causes the hazard of electric shock or fire!

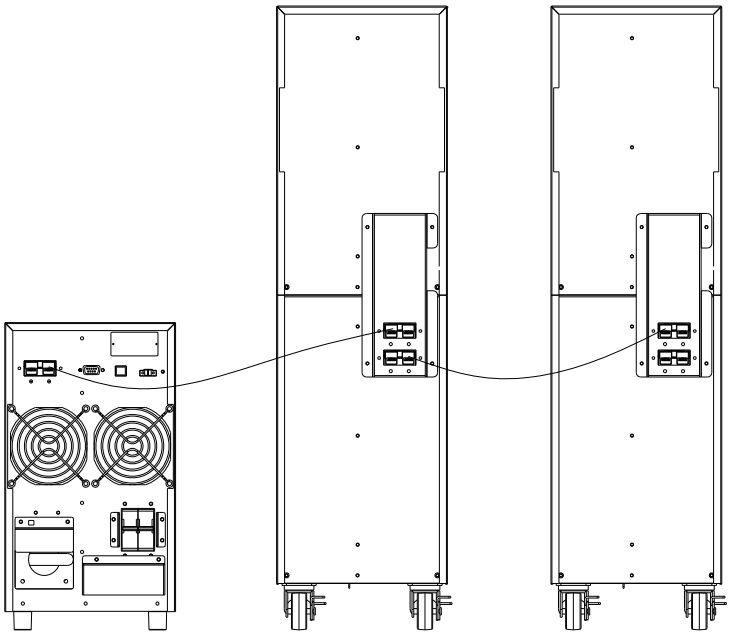
Warning: (Only for long-time model)

- Make sure a DC breaker or other protection device between UPS and external battery pack is installed. If not, please install it carefully. Switch off the battery breaker before installation.

Warning:

- For standard battery pack, there are one DC breaker to disconnect the battery pack and the UPS. But for other external battery pack, make sure a DC breaker or other protection device between UPS and external battery pack is installed. If not, please install it carefully. Switch off the battery breaker before installation.

NOTE: Set the battery pack breaker in “OFF” position and then install the battery pack.



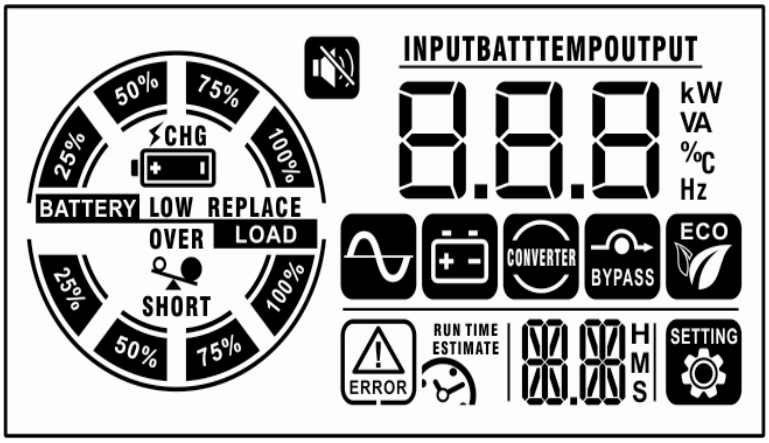
- Pay highly attention to the rated battery voltage marked on the rear panel. If you want to change the numbers of the battery pack, please make sure you modify the setting simultaneously. The connection with wrong battery voltage may cause permanent damage of the UPS. Make sure the voltage of the battery pack is correct.
- Pay highly attention to the polarity marking on external battery terminal block, and make sure the correct battery polarity is connected. Wrong connection may cause permanent damage of the UPS.
- Make sure the protective earth ground wiring is correct. The current spec, color, position, connection and conductance reliability of wire should be checked carefully.
- Make sure the utility input & output wiring is correct. The current spec, color, position, connection and conductance reliability of wire should be checked carefully. Make sure the L/N terminal is correct, not reverse or short-circuited.

2-3. Software Installation

For optimal computer system protection, install UPS monitoring software to fully configure UPS shutdown. Please insert the provided CD into CD-ROM to install the monitoring software.

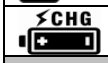
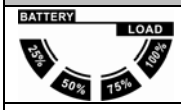
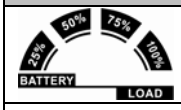
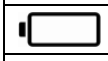
3. Operations

3-1. LCD panel

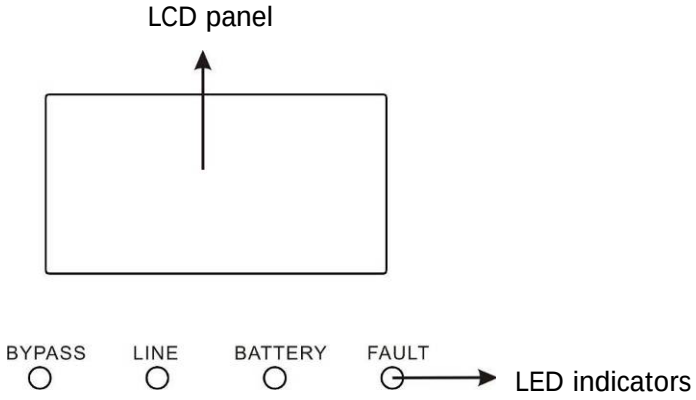


3-2. Button operation

Button	Function
ON/Enter Button	➢ Turn on the UPS: Press and hold the button more than 0.5s to turn on the UPS. ➢ Enter Key: Press this button to confirm the selection in setting menu.
OFF/ESC Button	➢ Turn off the UPS: Press and hold the button more than 0.5s to turn off the UPS. ➢ Esc key: Press this button to return to last menu in setting menu.
Test/Up Button	➢ Battery test: Press and hold the button more than 2s to test the battery while in AC mode, or CVCF mode (converter mode) ➢ UP key: Press this button to display next menu or selection.
Mute/Down Button	➢ Mute the alarm: Press and hold the button more than 2s to mute the buzzer. Please refer to section 3-4-9 for details. ➢ Down key: Press this button to display previous menu or selection.
Test/Up + Mute/Down Button	➢ Press and hold the two buttons simultaneous more than 1s to enter/escape the setting menu.

Display	Function
Estimated or running time setting and information	
	Remaining backup time.
	Running time.
	Remaining backup / Running time in numbers. **H: hour, M: minute, S: Second**
Warning and Fault information	
	Warning occurred.
	Fault occurred.
	Codes for warning and fault.
Setting operation	
	Indicates that the setting occurs.
Mute operation	
	UPS alarm is disabled.
UPS information	
	Indicates the input and output voltage, frequency, battery voltage, load information, and internal temperature. V: input/output voltage/ battery voltage, Hz: frequency, %: load level, °C: temperature, KW: active power, KVA: apparent power, A: output current,
Mode operation information	
	ONLINE mode.
	BATTERY mode.
	CONVERTER mode.
	BYPASS mode.
	ECO mode.
	UPS is charging battery.
Load information	
	Load level under 0-25%, 26-50%, 51-75%, and 76-100%.
	Overload.
	Outlets with output voltage.
SHORT	Load or UPS output with “short circuit.”
Battery information	
	Battery level under 0-25%, 26-50%, 51-75%, and 76-100%.
CHG	Charger is working.
	Indicates battery.
REPLACE	Battery replacement necessary.
LOW	Low battery voltage.

3-3. LED Indicators and LCD Panel



LED Indicators:

There are 4 LED light in the front panel to indicate the UPS working status:

Mode / LED	Bypass	Line	Battery	Fault
UPS Startup	●	●	●	●
Bypass mode	●	○	○	○
AC mode	○	●	○	○
Battery mode	○	○	●	○
CVCF mode	○	●	○	○
Battery Test	●	●	●	○
Fault	○	○	○	●

Note: ● LED lighting / ○ LED faded

* When the UPS under bypass mode, but no bypass output voltage exists. Bypass LED will flicker.

3-4. Audible Alarm

Description	**Buzzer status**	**Muted**
UPS status		
Bypass mode	Beeping once every 2 minutes	Yes
Battery mode	Beeping once every 4 seconds	
Fault mode	Beeping continuously	
Warning		
Overload	Beeping twice every second	No
Others	Beeping once every second	
Fault		
All	Beeping continuously	Yes

3-5. Single UPS Operation

1. Turn on the UPS with utility power supply (in AC mode)

1) After power supply is connected correctly, set the breaker of the battery pack at “ON” position (the step only available for long-time model). Then set the input breaker at “ON” position. At this time the fan is running and the UPS supplies power to the loads via the bypass. The UPS is operating in Bypass mode.

NOTE: When UPS is in Bypass mode, the output voltage will directly power from utility after you switch on the input breaker. In Bypass mode, the load is not protected by UPS. To protect your precious devices, you should turn on the UPS. Refer to next step.

2) Press and hold the “ON” button for 0.5s to turn on the UPS and the buzzer will beep once.

3) A few seconds later, the UPS will enter to AC mode. If the utility power is abnormal, the UPS will operate in Battery mode without interruption.

NOTE: When the UPS is running out battery, it will shut down automatically at Battery mode.

When the utility power is restored, the UPS will auto restart in AC mode.

2. Turn on the UPS without utility power supply (in Battery mode)

1) Make sure that the breaker of the battery pack is at “ON” position (only for long-time model).

2) Press and hold the “ON” button for 0.5s to turn on the UPS, and the buzzer will beep once.

3) A few seconds later, the UPS will be turned on and enter to Battery mode.

3. Connect devices to UPS

After the UPS is turned on, you can connect devices to the UPS.

1) Turn on the UPS first and then switch on the devices one by one, the LCD panel will display total load level.

2) If it is necessary to connect the inductive loads such as a printer, the in-rush current should be calculated carefully to see if it meets the capacity of the UPS, because the power consumption of this kind of loads is too big.

3) If the UPS is overload, the buzzer will beep twice every second.

4) When the UPS is overload, please remove some loads immediately. It is recommended to have the total loads connected to the UPS less than 80% of its nominal power capacity to prevent overload for system safety.

5) If the overload time is over acceptable time listed in spec at AC mode, the UPS will automatically transfer to Bypass mode. After the overload is removed, it will return to AC mode. If the overload time is over acceptable time listed in spec at Battery mode, the UPS will become fault status. At this time, if bypass is enabled, the UPS will power to the load via bypass. If bypass function is disabled or the input power is not within bypass acceptable range, it will cut off output directly.

4. Charge the batteries

1) After the UPS is connected to the utility power, the charger will charge the batteries automatically except in Battery mode or during battery self-test.

2) Suggest to charge batteries at least 10 hours before use. Otherwise, the backup time may be shorter than expected time.

3) Make sure the battery numbers setting on the control board (Please refer to the section 3-4-12 for detailed setting) is consistent to real connection.

4) The charging current can be changed from 0.5A to 6A via LCD or software. Please make sure that the charging current is suitable to battery specification.

5. Battery mode operation

1) When the UPS is in Battery mode, the buzzer will beep according to different battery capacity. If the battery capacity is more than 25%, the buzzer will beep once every 4 seconds; If the battery voltage drops to the alarm level, the buzzer will beep quickly (once every sec) to remind users that the battery is at low level and the UPS will shut down automatically soon. Users could switch off some non-critical loads to disable the shutdown alarm and prolong the backup time. If there is no more load to be switched off at that time, you have to shut down all loads as soon as possible to protect the devices or save data. Otherwise, there is a risk of data loss or load failure.
2) In Battery mode, if buzzer sound annoys, users can press the Mute button to disable the buzzer.
3) The backup time of the long-run model depends on the external battery capacity.
4) The backup time may vary from different environment temperature and load type.
5) When setting backup time for 16.5 hours (default value from LCD panel), after discharging 16.5 hours, UPS will shut down automatically to protect the battery. This battery discharge protection can be enabled or disabled through LCD panel control. (Refer to 3-6-2 LCD setting section)

6. Test the batteries

1) If you need to check the battery status when the UPS is running in AC mode/CVCF mode, you could press the “Test” button to let the UPS do battery self-test.
2) Users also can set battery self-test through monitoring software.

7. Turn off the UPS with utility power supply in AC mode

1) Turn off the inverter of the UPS by pressing “OFF” button for at least 0.5s, and then the buzzer will beep once. The UPS will turn into Bypass mode.

   NOTE : If the UPS has been set to enable the bypass output, it will bypass voltage from utility power to output sockets and terminal even though you have turned off the UPS (inverter).

   NOTE : After turning off the UPS, please be aware that the UPS is working at Bypass mode and there is risk of power loss for connected devices.
2) In Bypass mode, output voltage of the UPS is still present. In order to cut off the output, switch off the input breaker. A few seconds later, there is no display shown on the display panel and UPS is complete off.

8. Turn off the UPS without utility power supply in Battery mode

1) Turn off the UPS by pressing “OFF” button for at least 0.5s, and then the buzzer will beep once.
2) Then UPS will cut off power to output and there is no display shown on the display panel.

9. Mute the buzzer

1) To mute the buzzer, please press the “Mute” button for at least 0.5s. If you press it again after the buzzer is muted, the buzzer will beep again.
2) Some warning alarms can’t be muted unless the error is fixed. Please refer to section 3-3 for the details.

10. Operation in warning status

1) When Fault LED flashes and the buzzer beeps once every second, it means that there are some problems for UPS operation. Users can get the fault code from LCD panel. Please check the trouble shooting table in chapter 4 for details.
2) Some warning alarms can’t be muted unless the error is fixed. Please refer to section 3-3 for the details.

11. Operation in Fault mode

1) When Fault LED illuminates and the buzzer beeps continuously, it means that there is a fatal error in the UPS. Users can get the fault code from display panel. Please check the trouble shooting table in chapter 4 for details.
2) Please check the loads, wiring, ventilation, utility, battery and so on after the fault occurs. Don't try to turn on the UPS again before solving the problems. If the problems can't be fixed, please contact the distributor or service people immediately.
3) For emergency case, please cut off the connection from utility, external battery, and output immediately to avoid more risk or danger.

12. Operation of changing battery numbers

1) This operation is only available for professional or qualified technicians.
2) Turn off the UPS. If the load couldn't be cut off, you should remove the cover of maintenance bypass switch on the rear panel and turn the maintenance switch to "BPS" position first.
3) Switch off the input breaker, and switch off the battery breaker (only available for long-run model), or disconnect battery wire for standard model.
4) Remove the cabinet cover, and then modify the jumpers (JP1, JS3) on the control board to set the battery numbers as following table:

Battery Number	JP1				JS3
	pin1 & pin2	pin3 & pin4	Pin5 & pin6	pin7 & pin8	
16	X	X	0	0	0
17	X	X	1	1	0
18	X	X	0	0	1
19	X	X	1	0	1
20	X	X	1	1	1

Note： 1 = connect with jumper
0 = no jumper
x = the pins are for other functions.

5) Modify the battery pack for the setting number carefully. After complete it, put the cover back, and switch on the battery breaker for long-run model.
6) Switch on the input breaker and the UPS will enter Bypass mode. If the UPS is in maintenance Bypass mode, turn the maintenance switch to "UPS" position and then turn on the UPS.

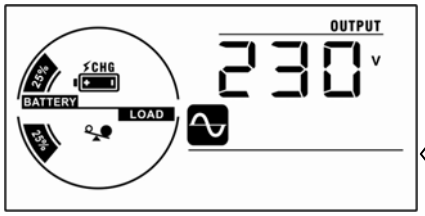
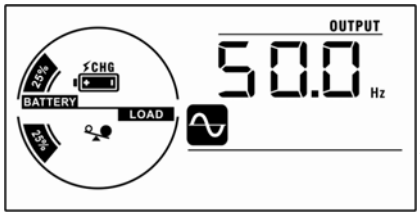
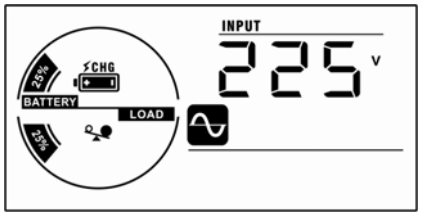
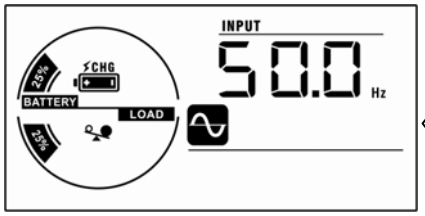
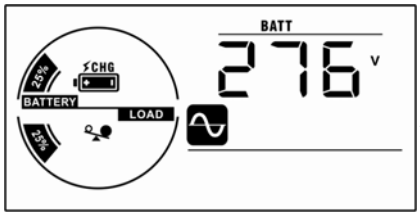
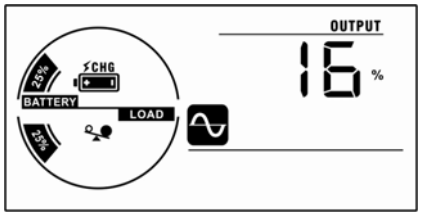
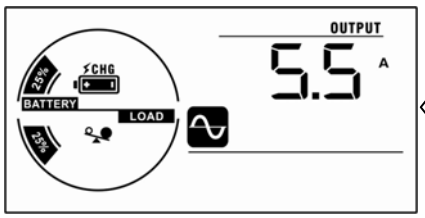
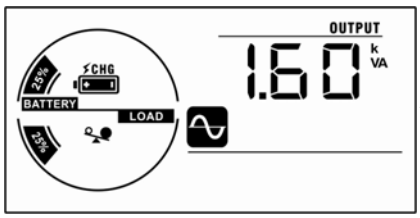
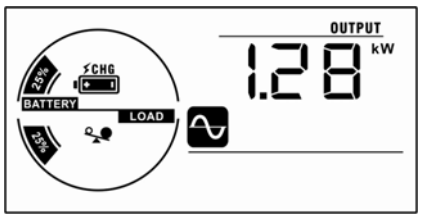
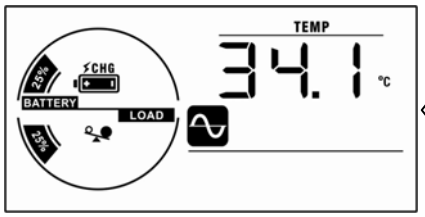
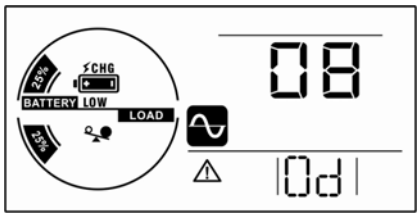
3-6. LCD display wordings index

Display content	Abbreviation	Meaning
ENA	ENA	Enable
dIS	DIS	Disable
AtO	ATO	Auto
ON	ON	On
OFF	OFF	Off
Fbd	FBD	Not allowed
OPN	OPN	Allow

3-7. LCD Display

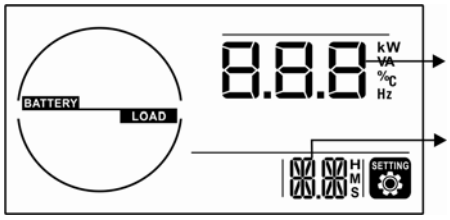
3-7-1. LCD Main Interface

Press up key or down key to select the displayed information.

1 Output Voltage 	**2 Output Frequency** 	**3 Input Voltage** 
4 Input Frequency 	**5 Battery Voltage** 	**6 Load Level** 
7 Output Current 	**8 Output Apparent Power** 	**9 Output Active Power** 
10 Maximum Temperature 	**11 Warning Information** 	

3-7-2. UPS Setting

At the main interface; press and hold the “up” and “down” buttons simultaneous for more than 1 second to enter or escape from setting menu.



Two parameters to set up the UPS.

Parameter 1: For program alternatives.

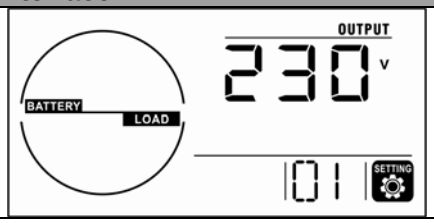
Parameter 2: Option setting or values for each program.

Available programs list for parameter 1:

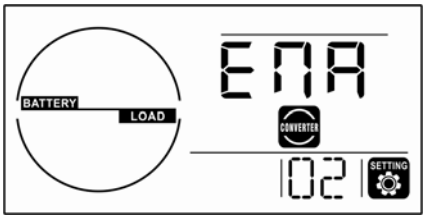
Code	Description	Bypass	AC	CVCF	Battery	Battery Test
01	Output voltage	Y				
02	CVCF mode enable/disable	Y				
03	Output frequency	Y				
04	Acceptable low voltage for bypass mode	Y				
05	Acceptable high voltage for bypass mode	Y				
06	Acceptable low frequency for bypass mode	Y				
07	Acceptable high frequency for bypass mode	Y				
08	Bypass mode forbidden/allowed	Y				
09	Manual bypass mode enable/disable	Y				
10	Battery backup time setting	Y	Y	Y	Y	Y
11	Hot standby function enable/disable	Y	Y	Y	Y	Y
12	Battery voltage calibration	Y	Y	Y	Y	Y
13	Charger voltage calibration	Y	Y	Y	Y	Y
14	Maximum charger current setting	Y	Y	Y	Y	Y
15	Battery capacity setting	Y	Y	Y	Y	Y
16	Battery group setting	Y	Y	Y	Y	Y
17	Backup time calibration	Y	Y	Y	Y	Y
18	Output voltage calibration		Y	Y	Y	Y

*Y means that this program can be set in this mode.

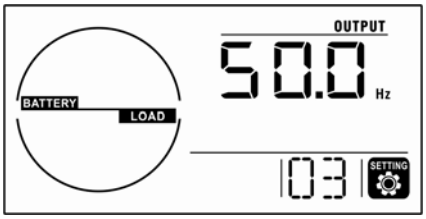
➢ **01: Output voltage**

Interface	Setting
	**Parameter 2: Output voltage** Output voltage can be chosen in parameter 2 as below: **208:** output voltage is 208Vac **220:** output voltage is 220Vac **230:** output voltage is 230Vac **240:** output voltage is 240Vac

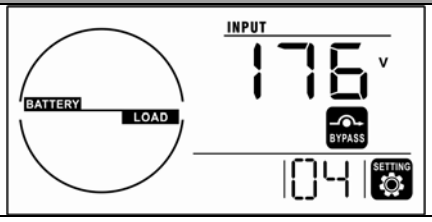
➢ **02: Frequency Converter enable/disable**

Interface	Setting
	**Parameter 2: Frequency mode** Setting output frequency at CVCF mode or not CVCF mode. Two options can be chosen in parameter 2 as below: **ENA:** Setting UPS to CVCF mode. If selected, the output frequency will be fixed at 50Hz or 60Hz according to "**Output frequency setting**". The input frequency could be from 46Hz to 64Hz. **DIS:** Setting UPS to normal mode (not CVCF mode). If selected, the output frequency will synchronize with the input frequency within 46~54 Hz at 50Hz or within 56~64 Hz at 60Hz according to setting in **"Output frequency setting"**. If 50Hz is selected in **"Output frequency setting"**, UPS will transfer to battery mode when input frequency is not within 46~54 Hz. If 60Hz is selected in **"Output frequency setting"**, UPS will transfer to battery mode when input frequency is not within 56~64 Hz.

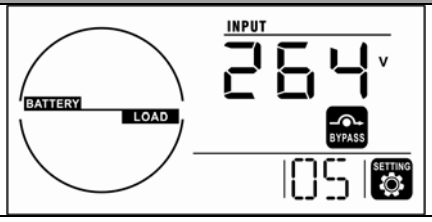
➢ **03: Output frequency setting**

Interface	Setting
	**Parameter 2: Output Frequency** **50.0Hz:** output frequency is setting for 50.0Hz. **60.0Hz:** output frequency is setting for 60.0Hz. **ATO:** If selected, output frequency will be changed based on the latest input utility frequency. If it is within 46Hz and 54Hz, the output frequency will be 50.0Hz. If it is within 56Hz and 64Hz, the output frequency will be 60.0Hz. ATO is default setting. If converter mode is enabled and output frequency is set to ATO mode, it will display "A50" when UPS is working on 50Hz mode or "A60" when UPS is working on 60Hz mode in LCD.

➢ **04: Acceptable low voltage for bypass**

Interface	Setting
	**Parameter 2:** Set the acceptable low voltage for bypass. Setting range is from 110V to 209V and the default value is 110V.

➢ **05: Acceptable high voltage for bypass mode**

Interface	Setting
	**Parameter 2:** Set the acceptable high voltage for bypass. Setting range is from 231V to 276V and the default value is 264V.

USER'S MANUAL

KNIGHT ONLINE SERIES

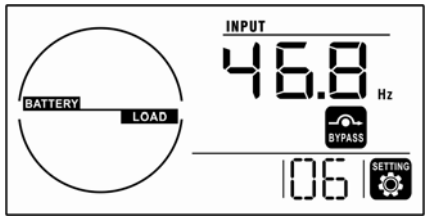
UPS

220V

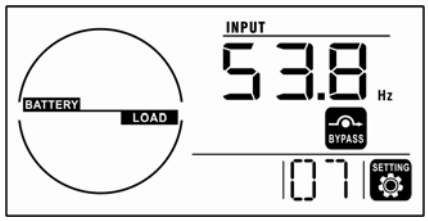
6000(L) / 10000(L)

Uninterruptible Power Supply System

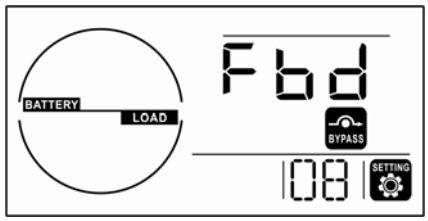
➢ **06: Acceptable low frequency for bypass mode**

Interface	Setting
	**Parameter 2:** Set the acceptable low frequency for bypass. 50 Hz system: Setting range is from 46.0Hz to 49.0Hz. 60 Hz system: Setting range is from 56.0Hz to 59.0Hz. The default value is 46.0Hz/56.0Hz.

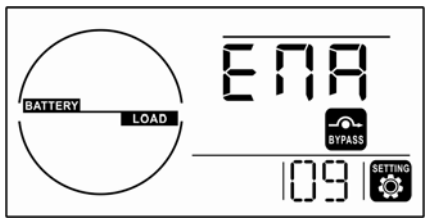
➢ **07: Acceptable high frequency for bypass mode**

Interface	Setting
	**Parameter 2:** Set the acceptable high frequency for bypass. 50 Hz: Setting range is from 51.0Hz to 54.0 Hz. 60 Hz: Setting range is from 61.0Hz to 64.0Hz. The default value is 54.0Hz/64.0Hz.

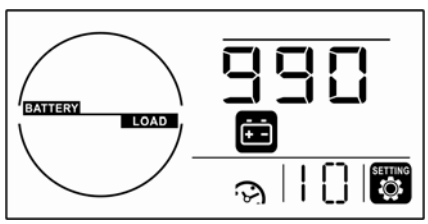
➢ **08: Bypass mode forbidden/allowed**

Interface	Setting
	**Parameter 2:** Allow or forbidden bypass mode **FBD:** Bypass not allowed. When selected, it's not allowed for running in Bypass mode under any situations. **OPN:** Bypass allowed. When selected, UPS will run at Bypass mode depending on the setting of "**Manual Bypass enable/disable**"

➢ **09: Manual bypass enable/disable**

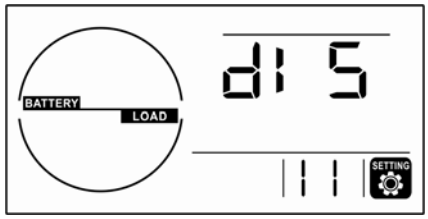
Interface	Setting
	**Parameter 2:** **ENA**: Manual bypass enabled. When selected, bypass mode is activated. **DIS:** Manual bypass disabled. When selected, automatic bypass is acceptable, but manual bypass is not allowed. *Manual bypass means users manually operate UPS in Bypass mode. For example, pressing "OFF" button in AC mode to turn the UPS into Bypass mode.

➢ **10: Battery backup time setting**

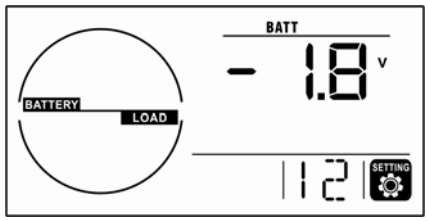
Interface	Setting
	**Parameter 2:** **001~999:** Set the maximum backup time from 1 min to 999 min. UPS will shut down to protect battery after backup time arrives. The default value is 990. **DIS:** Disable battery discharge protection and backup time will depend on battery capacity.

➢ **11: Hot standby function enable/disable**

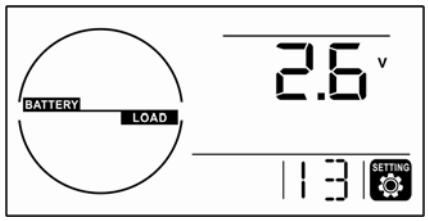
I.

Interface	Setting
	**Parameter 2:** Enable or disable hot standby function. **ENA:** Hot standby function is enabled. It means that the current UPS is set to host of the hot standby function, and it will restart after AC recovery even without battery connected. **DIS:** Hot standby function is disabled. The UPS is running at normal mode and can't restart without battery

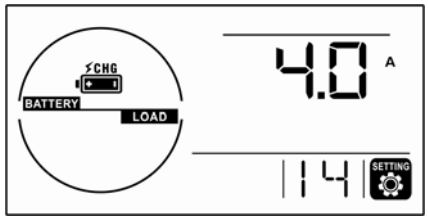
➢ **12: Battery voltage calibration**

Interface	Setting
	**Parameter 2:** The voltage range is from -5.7V to 5.7V, the default value is 0V.

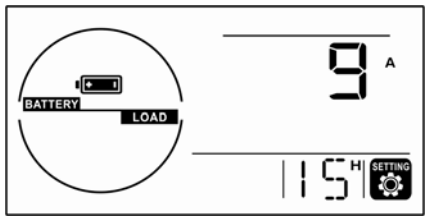
➢ **13: Charger voltage calibration**

Interface	Setting
	**Parameter 2:** Voltage range is from -9.9V to 9.9V and the default value is 0V. **NOTE:** Before making voltage adjustment, be sure to disconnect all batteries first to get the accurate charger voltage. ● Strongly suggest using the default value (0). ● Any modification should be suitable to battery specifications.

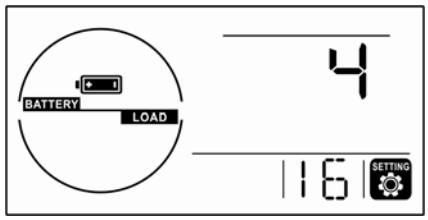
➢ **14: Maximum charger current setting**

Interface	Setting
	**Parameter 2:** The maximum charging current could be adjusted. Default value is 4A for long run model and 1A for standard model. The setting range is 0.5A~6A for long run model, and 0.5A~2A for standard model. **Note:** Any modification should be suitable to battery specifications. If input voltage is below 200VAC, the ups will reduce charging current to 4A automatically even though the setting is 6A.

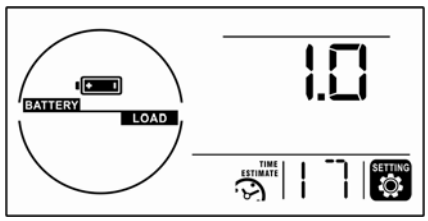
➢ **15: Battery capacity setting**

Interface	Setting
	**Parameter 2:** Set the battery capacity such as 7AH, 9AH, 10AH, 12AH, 17AH, 26AH, 40AH, 65AH, 100AH and so on. The default value is 9AH.

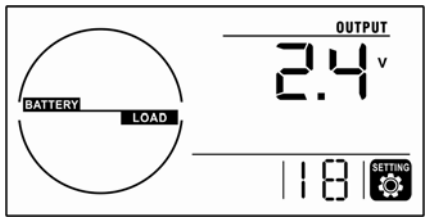
➢ **16: Battery group setting**

Interface	Setting
	**Parameter 2:** Set battery group range from 1 to 6. The default value is 1 group. These parameters are for the battery backup time calculation.

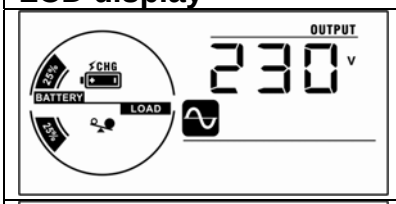
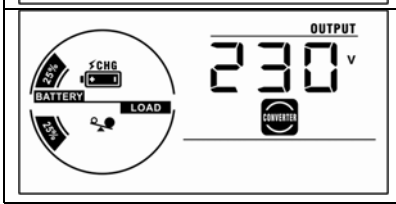
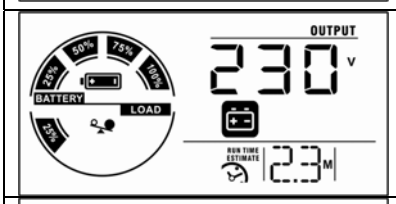
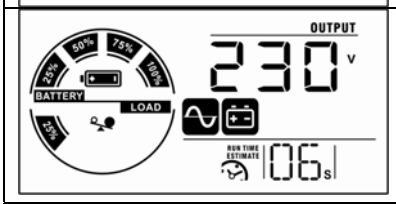
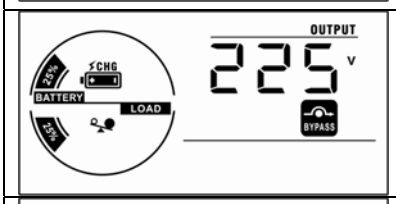
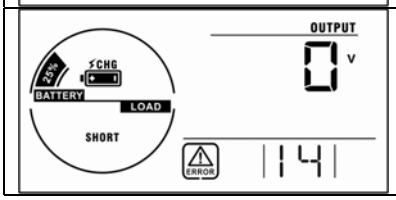
➢ **17: Backup time calibration**

Interface	Setting
	**Parameter 2:** Calibrate the displayed backup time by adjusting this multiplier factor. The displayed backup time will be equal with the original calculated backup time multiply this value. The default value is 1.0, and the range is from 0.5 to 2.

➢ **18: Output voltage calibration**

Interface	Setting
	**Parameter 2:** The voltage range is from -6.4V to 6.4V, and the default value is 0V.

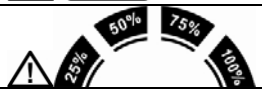
3-8. Operating Mode/Status Description

LCD display	Operating mode	Description
	AC mode	When the input voltage is within acceptable range, UPS will provide pure and stable AC power to output. The UPS will also charge the battery at AC mode.
	CVCF mode	When input frequency is between 46Hz and 64Hz, the UPS can be set at a constant output frequency, 50 Hz or 60 Hz. The UPS will still charge battery under this mode.
	Battery mode	When the input voltage is beyond the acceptable range or power failure, UPS will backup power from battery and alarm will beep every 4 seconds.
	Battery Test	When UPS is in AC mode or CVCF mode, press “Test” key for more than 2 seconds. Then, UPS will beep once and start “Battery Test”. This operation is used to check the battery status.
	Bypass mode	When input voltage is within acceptable range and bypass is enabled, turn off the UPS and it will enter Bypass mode. Alarm beeps every two minutes.
	Fault status	When fault occurs in UPS, it will display fault icon and fault code in LCD panel.

3-9. Fault Code

Fault event	Fault code	Icon	Fault event	Fault code	Icon
Bus start failure	01	None	Battery SCR short circuited	21	None
Bus over	02	None	Inverter relay short circuited	24	None
Bus under	03	None	Battery or Charger short circuited	2A	None
Bus unbalance	04	None	Parallel communication failure	35	None
Inverter soft start failure	11	None	Parallel output current unbalance	36	None
High Inverter voltage	12	None	Over temperature	41	None
Low Inverter voltage	13	None	CPU communication failure	42	None
Inverter output short circuited	14	SHORT	Overload	43	OVER
Negative power fault	1A	None			

3-10. Warning Indicator

Warning Description	code	Icon (flashing)	Alarm
Battery is not connected	01		Beeping every second
Over charge	07		Beeping every second
Low battery	08		Beeping every second
Overload	09		Beeping twice every second
Charger failure	0E		Beeping every second
Other warnings	0A,0B,0D, 10, 33, 3A, 3F		Beeping every second

4. Trouble Shooting

If the UPS system does not operate correctly, please solve the problem by using the table below.

Alarm type	Code	Possible cause	Remedy
Warning	01	1) The battery is not connected well; 2) The battery protection device is open.	1) Connect the battery well; 2) Replace or restore the protection device.
Warning	07	1) Battery numbers and its setting is not matching; 2) Charger voltage is too high. It will cause charger failure.	1) Correct the battery number or its setting; 2) Disconnect the battery and check the charger output voltage. Then, contact the dealer for repair.
Warning	08	1) Battery is discharged deeply to low voltage. 2) Battery number is not correct. 3) Battery is in the end of life.	1) Recharge the battery. 2) Correct the battery number. 3) Replace the battery.
Warning	09	Overload.	Remove excess loads from UPS output.
Warning	0A	1) Fan is blocked. 2) Fan is in the end of life. 3) Fan circuit failed.	1) Clean fan to make sure it is not blocked. 2) Contact the dealer to replace the fan. 3) Contact the dealer for repair.
Warning	0B	EPO plug (jumper) is removed or the external EPO switch is off.	Connect the EPO plug (jumper) well or switch on the external EPO switch.
Warning	0D	The internal temperature is too high and reaches warning level: 1) Maybe the environment is hot. 2) Maybe the fan is blocked or failed. 3) Maybe the ventilation is blocked by the wall or other goods. 4) Overload	1) Make sure the ambient temperature is not over 40°C. 2) Make sure the fan is OK. 3) Make sure ventilation is well. 4) Remove some loads if possible.
Warning	0E	Charger failure.	Contact the dealer for repair.
Warning	10	Input fuse on the power stage board is blown.	Check and replace the input fuse.
Warning	33	Locked in bypass after overload 3 times in 30 minutes.	Remove excess loads from UPS output first. Then, shut down the UPS and restart it.
Warning	3A	Cover of maintain switch is open.	Please put the cover back.

Alarm type	Code	Possible cause	Remedy
Warning	3F	Parallel communication cable loosen or incorrect parallel operation.	1) For parallel system, please make sure parallel communication cable connected tightly and also check if the **"parallel information"** in LCD is ok. Then, it's ok to turn on UPS after removing warning message by pressing 'UP' and 'DOWN' button together. Otherwise, please do not try to turn on UPS and contact your dealer for help; 2) For single UPS (no communication cable and no parallel output cable connected with others as well), customer can ignore this warning message and remove it by pressing 'UP' and 'DOWN' button. Simply turn on UPS for continuous operation.
Fault	01	The internal converter failed, so the DC bus voltage could not be boosted correctly.	Contact the dealer for repair
Fault	02	1) The mains input or load transient current cause the DC bus voltage too high. 2) The internal converter failed.	1) Shut down and restart the UPS to see if it happens again. If the problem still persists, please contact the dealer for repair. 2) Contact the dealer for repair.
Fault	03	The internal converter fails, so the DC bus voltage is too low.	Contact the dealer for repair.
Fault	04	1) The load is special or abnormal, so the internal positive and negative DC bus voltages are unbalanced; 2) The internal converter failed.	Contact the dealer.
Fault	11	The internal inverter fails, so the inverter voltage could not start up correctly.	Contact the dealer for repair.
Fault	12	The internal inverter fails, so the inverter voltage is too high.	Contact the dealer for repair.
Fault	13	The internal inverter fails, so the inverter voltage is too low.	Contact the dealer for repair.
Fault	14	Short circuit occurs on the UPS output.	Remove short circuited output/situation. If the problem still persists, please contact the dealer for repair.
Fault	1A	UPS output power is negative. It means there is energy feedback into the UPS from output. It may be caused by regenerative load or the current control failure in the parallel system.	Contact the dealer.
Fault	21	The internal battery SCR failed and short circuited.	Contact the dealer for repair.

Alarm type	code	Possible cause	Remedy
Fault	24	The internal inverter relay is stick to short circuited or the SCR of STS (Static Transfer Switch) is short-circuited.	Contact the dealer for repair.
Fault	2A	The battery or charger is short circuited.	Contact the dealer for repair.
Fault	35	Parallel cable for communication is not connected well in the parallel system.	Connect the parallel cable well.
Fault	36	The output current is extremely unbalanced between the paralleled UPSs. There is some error in the parallel system.	Contact the dealer for repair.
Fault	41	The internal temperature is too high and reaches the fault level (shutdown point): 1) Maybe the environment is hot. 2) Maybe the fan is blocked or failed. 3) Maybe the ventilation is blocked by the wall or other goods. 4) Overload	1) Make sure the ambient temperature not over 40ºC; 2) Make sure the fan is OK; 3) Make sure the ventilation is well; 4) Remove some loads if possible.
Fault	42	Internal communication between the CPUs failed	Contact the dealer for repair.
Fault	43	Overload times are out of the specification and the UPS shuts down automatically.	Remove excess loads from UPS output and restart it.

6. Storage and Maintenance

Operation

This UPS system contains no user-serviceable parts.

If the battery service life (3~5 years at 25°C ambient temperature) has been exceeded, the batteries must be replaced.

In this case, please contact your dealer.

Storage

Before storing, charge the UPS at least 7 hours.

Store the UPS covered and upright in a cool, dry location.

During storage, recharge the battery in accordance with the following table:

Storage Temperature	Recharge Frequency	Charging Duration
-25°C - 40°C	Every 3 months	1-2 hours
40°C - 45°C	Every 2 months	1-2 hours

6. Specifications

MODEL		KO-6000 / KO-6000L	KO-10000 / KO-10000L
Input	Capacity	6KVA / 4.8KW	10KVA / 8KW
	Phase	Single Phase	
	Nominal Voltage	208/220/230/240 VAC	
	Voltage Range	176VAC ~ 300VAC (100% Load)	
	Frequency	46 Hz ~ 54Hz or 56Hz ~ 64Hz	
	Power Factor	≧ 0.99 @ 100% load	
Output	Voltage Range	208/220/230/240 VAC	
	Frequency	Line Mode: Same as Input. ; Battery Mode: 50Hz or 60Hz ±0.1Hz	
	Wave Form	Pure Sinewave	
	Harmonic Distortion	≦ 3% THD (Linear Load) ; ≦ 6% THD (Non-Linear Load)	
	Overload Capacity (Line Mode)	100%~110%:10 mins; 110%~130%:1 min; >130%: 1 sec	
	Overload Capacity (Battery Mode)	100%~110%:30 sec; 110%~130%:10 sec; >130%: 1 sec	
	Auto Retransfer	After Overload Recover 90% Load	
Battery	Type	Maintenance Free Sealed Lead-Acid Battery	
	DC Voltage	240V	240V
	Capacity	12V / 9.0Ah x 16 pcs	12V / 9.0Ah x 20 pcs
	Built-In Charger	Default: 1 A ±10% , Max: 2 A ±10%	
	Charger (Optional)	Default: 4 0A ±10% , Max: 6.0 A ±10%	
	Recharger Time	9 hours recover to 90% capacity	
	Battery Handle	Fully recharge UPS after complete discharge or every three months when storaged	
Bypass	Automatic	Overload or UPS Failure	
	Transfer Time	0 ms (<4ms Line Mode to Bypass)	
Display	LCD	UPS status, Load level, Battery level, Input/Output voltage, Discharge timer, and Fault conditions	
Audible Alarm	Battery Mode	Beep every 4 seconds	
	Battery Low	Beep every second	
	Overload	Beep twice every second	
	Fault	Beep continously	
Output	Sockets	Terminal Block	
Interface	Smart RS-232 & USB	Supports Windows® 2000/2003/XP/Vista/2008, Windows® 7, Linux, Unix, and MAC	
	SNMP Card (Optional)	Power management from SNMP manager and web browser	
Network	Surge Protection	Optional (RJ-45)	
Environment	Temperature	0℃ ~ 40℃ ; 32℉ ~104℉	
	Humidity	0-90 % RH Non-condensing	
	Acoustic Noise	Less than 55dBA at 1mt	Less than 58dBA at 1mt
Net Weight	W/O Battery (Kgs)	21	23
	With Battery (Kgs)	60	75
Dimensions	Standard (W x H x D) mm	190*688*369	190*688*442
	Long (W x H x D) mm	190*318*369	190*318*442

* Derate capacity to 60% of capacity in CVCF mode and to 90% when the output voltage is adjusted to 208VAC.
**If the UPS is installed or used in a place where the altitude is above than 1000m, the output power must be derated one percent per 100m.
***Product specifications are subject to change without further notice.

Contents

1. Safety Warning 1
1-1. Transportation 1
1-2. Preparation 1
1-3. Installation 1
1-4. Operation 1
1-5. Maintenance, service and faults 2
2. Installation and setup 3
2-1. Rear panel view 3
2-2. Setup the UPS 3
3. Operations 5
3-1. LCD Panel 5
3-2. Button Operation 5
3-3. Audible Alarm 7
3-4. LCD display wordings index 7
3-5. UPS Setting 7
3-6. Operating Mode Description 10
3-7. Faults Reference Code 11
3-8. Warning indicator 12
4. Troubleshooting 13
5. Storage and Maintenance 14
6. Specifications 15

1. Safety Warning

Please comply with all warnings and operating instructions in this manual strictly. Save this manual properly and read carefully the following instructions before installing the unit. Do not operate this unit before reading through all safety information and operating instructions carefully

1-1. Transportation

- Please transport the UPS system only in the original package to protect against shock and impact.

1-2. Preparation

- Condensation may occur if the UPS system is moved directly from cold to warm environment. The UPS system must be absolutely dry before being installed. Please allow at least two hours for the UPS system to acclimate the environment.
- Do not install the UPS system near water or in moist environments.
- Do not install the UPS system where it would be exposed to direct sunlight or near heater.
- Do not block ventilation holes in the UPS housing.

1-3. Installation

- Do not connect appliances or devices which would overload the UPS system (e.g. laser printers) to the UPS output sockets.
- Place cables in such a way that no one can step on or trip over them.
- Do not connect domestic appliances such as hair dryers to UPS output sockets.
- The UPS can be operated by any individuals with no previous experience.
- Connect the UPS system only to an earthed shockproof outlet which must be easily accessible and close to the UPS system.
- Please use only VDE-tested, CE-marked mains cable (e.g. the mains cable of your computer) to connect the UPS system to the building wiring outlet (shockproof outlet).
- Please use only VDE-tested, CE-marked power cables to connect the loads to the UPS system.
- When installing the equipment, it should ensure that the sum of the leakage current of the UPS and the connected devices does not exceed 3.5mA.

1-4. Operation

- Do not disconnect the mains cable on the UPS system or the building wiring outlet (shockproof socket outlet) during operations since this would cancel the protective earthing of the UPS system and of all connected loads.
- The UPS system features its own, internal current source (batteries). The UPS output sockets or output terminals block may be electrically live even if the UPS system is not connected to the building wiring outlet.
- In order to fully disconnect the UPS system, first press the OFF/Enter button to disconnect the mains.
- Prevent no fluids or other foreign objects from inside of the UPS system.

1-5. Maintenance, service and faults

- The UPS system operates with hazardous voltages. Repairs may be carried out only by qualified maintenance personnel.
- **Caution -** risk of electric shock. Even after the unit is disconnected from the mains (building wiring outlet), components inside the UPS system are still connected to the battery and electrically live and dangerous.
- Before carrying out any kind of service and/or maintenance, disconnect the batteries and verify that no current is present and no hazardous voltage exists in the terminals of high capability capacitor such as BUS-capacitors.
- Only persons are adequately familiar with batteries and with the required precautionary measures may replace batteries and supervise operations. Unauthorized persons must be kept well away from the batteries.

Caution - risk of electric shock. The battery circuit is not isolated from the input voltage. Hazardous voltages may occur between the battery terminals and the ground. Before touching, please verify that no voltage is present!

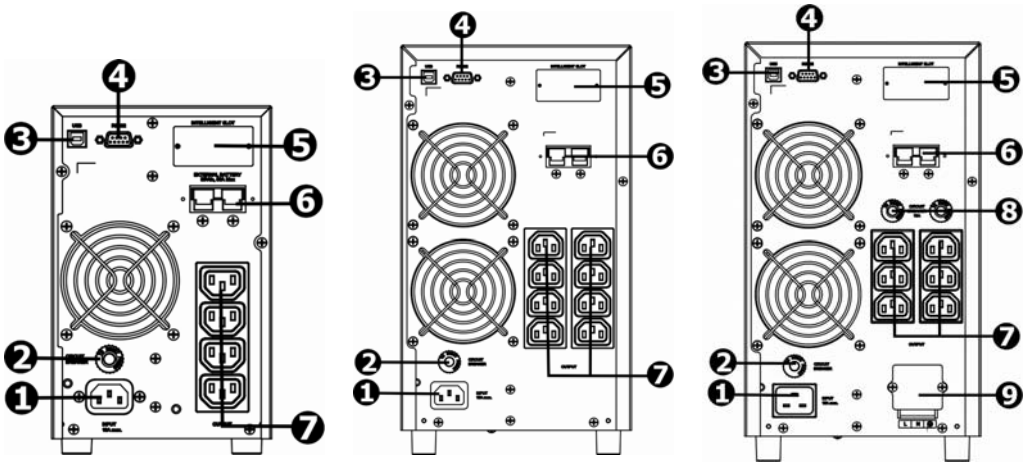
- Batteries may cause electric shock and have a high short-circuit current. Please take the precautionary measures specified below and any other measures necessary when working with batteries:
  - remove wristwatches, rings and other metal objects
  - use only tools with insulated grips and handles.
- When changing batteries, install the same number and same type of batteries.
- Do not attempt to dispose of batteries by burning them. This could cause battery explosion.
- Do not open or destroy batteries. Escaping electrolyte can cause injury to the skin and eyes. It may be toxic.
- Please replace the fuse only with the same type and amperage in order to avoid fire hazards.
- Do not dismantle the UPS system.

2. Installation and set up

NOTE: Before installation, please inspect the unit. Be sure that nothing inside the package is damaged. Please keep the original package in a safe place for future use.
NOTE: There are two different types of online UPS: standard and long-run models. Please refer to the following model table.

Model	Type	Model	Type
1K	Standard	1KL	Long-time
2K		2KL	
3K		3KL	

2-1. Rear panel view



1K (L) IEC **2K (L) IEC** **3K(L) IEC**

1. AC input
2. Input circuit breaker
3. USB communication port
4. RS-232 communication port
5. SNMP intelligent slot
6. External battery connection (only available for L model)
7. Output receptacles
8. Output circuit breaker
9. Output terminal

2-2. Setup the UPS

Step 1: UPS input connection

Plug the UPS into a two-pole, three-wire, grounded receptacle only. Avoid using extension cords.

- For 200/208/220/230/240VAC models: The power cord is supplied in the UPS package.
- For 100/110/115/120/127VAC models: The power cord is attached to the UPS. The input plug is a NEMA 5-15P for 1K and 1KLmodels, NEMA 5-20P for 2K and 2KL models.

Note: *For Low voltage models*. Check if the site wiring fault indicator lights up in LCD panel. It will be illuminated when the UPS is plugged into an improperly wired utility power outlet (Refer to Troubleshooting section). Please also install a circuit breaker (40A) between the mains and AC input in 3K model for safety operation.

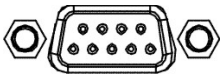
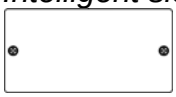
Step 2: UPS output connection

- For socket-type outputs, simply connect devices to the outlets.
- For terminal-type input or outputs, please follow below steps for the wiring configuration:

a) Remove the small cover of the terminal block
b) Suggest using AWG14 or 2.1mm^2 power cords. Suggest using AWG12-10 or 3.3mm^2-5.3mm^2 power cords for NEMA type.
c) Upon completion of the wiring configuration, please check whether the wires are securely affixed.
d) Put the small cover back to the rear panel.

Step 3: Communication connection
Communication port:

USB port *RS-232 port* *Intelligent slot*

To allow for unattended UPS shutdown/start-up and status monitoring, connect the communication cable one end to the USB/RS-232 port and the other to the communication port of your PC. With the monitoring software installed, you can schedule UPS shutdown/start-up and monitor UPS status through PC.

The UPS is equipped with intelligent slot perfect for either SNMP or AS400 card. When installing either SNMP or AS400 card in the UPS, it will provide advanced communication and monitoring options.

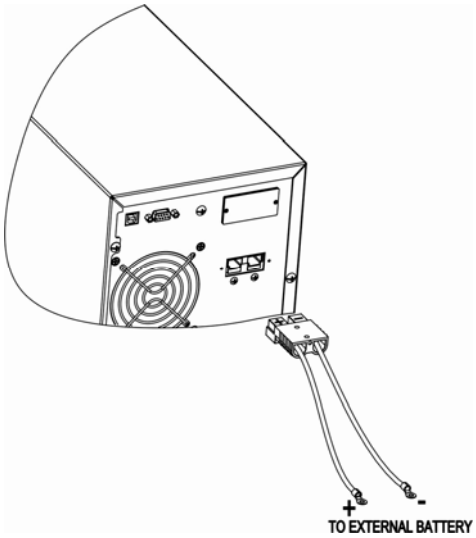
PS. USB port and RS-232 port can't work at the same time.

Step 4: Turn on the UPS
Press the ON/Mute button on the front panel for two seconds to power on the UPS.
Note: The battery charges fully during the first five hours of normal operation. Do not expect full battery run capability during this initial charge period.

Step 5: Install software
For optimal computer system protection, install UPS monitoring software to fully configure UPS shutdown. Please insert the provided CD into CD-ROM to install the monitoring software.

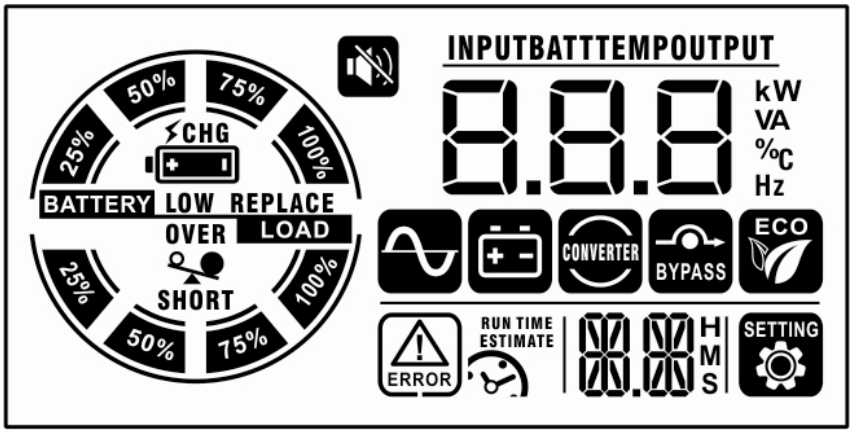
Step 6: External battery connection (for long-time models only)

Follow the right chart to make external battery connection.



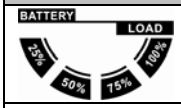
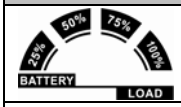
3. Operations

3-1. LCD panel



3-2. Button operation

Button	Function
OFF/Enter Button	➢ Turn off the UPS: Press and hold this button at least 2 seconds to turn off the UPS in battery mode. UPS will be in standby mode under power normal or transfer to Bypass mode if the Bypass enable setting by pressing this button. ➢ Confirm selection key: Press this button to confirm selection in UPS setting mode.
ON/Mute Button	➢ Turn on the UPS: Press and hold ON/Mute button for at least 2 seconds to turn on the UPS. ➢ Mute the alarm: When the UPS is on battery mode, press and hold this button for at least 5 seconds to disable or enable the alarm system. But it's not applied to the situations when warnings or errors occur. ➢ Up key: Press this button to display previous selection in UPS setting mode. ➢ Switch to UPS self-test mode: Press and hold ON/Mute button for 5 seconds to enter UPS self-testing while in AC mode, ECO mode, or converter mode.
ON/Mute + Select Button	➢ Switch to bypass mode: When the main power is normal, press ON/Mute and Select buttons simultaneously for 5 seconds. Then UPS will enter to bypass mode. This action will be ineffective when the input voltage is out of acceptable range.
Select Button	➢ Switch LCD message: Press this button to change the LCD message for input voltage, input frequency, battery voltage, output voltage and output frequency. It will return back to default display when pausing for 60 seconds. ➢ Setting mode: Press and hold this button for 5 seconds to enter UPS setting mode when UPS is in standby mode or bypass mode. ➢ Down key: Press this button to display next selection in UPS setting mode.

Display	Function
Estimated or running time setting and information	
	Remaining backup time.
	Running time.
	Remaining backup / Running time in numbers. **H: hour, M: minute, S: Second**
Warning and Fault information	
	Warning occurred.
	Fault occurred.
	Codes for warning and fault.
Setting operation	
	Indicates that the setting occurs.
Mute operation	
	UPS alarm is disabled.
UPS information	
	Indicates the input and output voltage, frequency, battery voltage, load information, and internal temperature. V: input/output voltage/ battery voltage, Hz: frequency, %: load level, °C: temperature, KW: active power, KVA: apparent power, A: output current,
Mode operation information	
	ONLINE mode.
	BATTERY mode.
	CONVERTER mode.
	BYPASS mode.
	ECO mode.
	UPS is charging battery.
Load information	
	Load level under 0-25%, 26-50%, 51-75%, and 76-100%.
	Overload.
	Outlets with output voltage.
SHORT	Load or UPS output with “short circuit.”
Battery information	
	Battery level under 0-25%, 26-50%, 51-75%, and 76-100%.
CHG	Charger is working.
	Indicates battery.
REPLACE	Battery replacement necessary.
LOW	Low battery voltage.

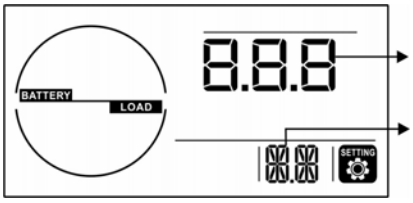
3-3. Audible Alarm

Battery Mode	Beeping every 4 seconds
Bypass Mode	Beeping every 10 seconds
Low Battery	Beeping every second
Overload	Beeping twice every second
Fault	Continuously sounding

3-4. LCD display wordings index

Display content	Abbreviation	Meaning
ENA	ENA	Enable
dIS	DIS	Disable
ESC	ESC	Escape
LLS	LLS	Low loss
HLS	HLS	High loss
TP	TP	Temperature
CH	CH	Charger
bF	BF	Battery fault
FU	FU	Bypass frequency unstable
EE	EE	EEPROM error

3-5. UPS Setting



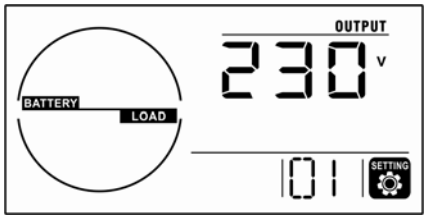
Parameter 2

Parameter 1

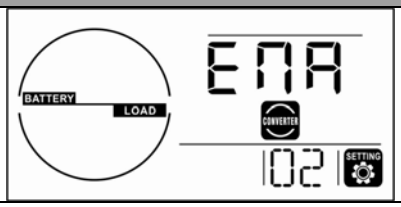
Two parameters to set up the UPS:

Parameter 1: For program alternatives.
Parameter 2: Option setting or values for each program.

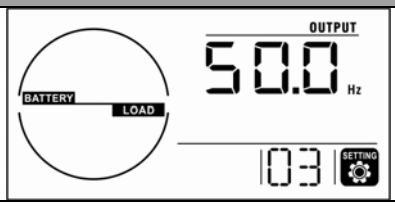
- **01: Output voltage setting**

Interface	Setting
	For 200/208/220/230/240 VAC models, O/P may be chosen as the following: 200: output voltage is 200Vac 208: output voltage is 208Vac 220: output voltage is 220Vac 230: output voltage is 230Vac (Default) 240: output voltage is 240Vac For 100/110/115/120/127 VAC models, O/P may be chosen as the following: 100: output voltage is 100Vac 110: output voltage is 110Vac 115: output voltage is 115Vac 120: output voltage is 120Vac (Default) 127: output voltage is 127Vac

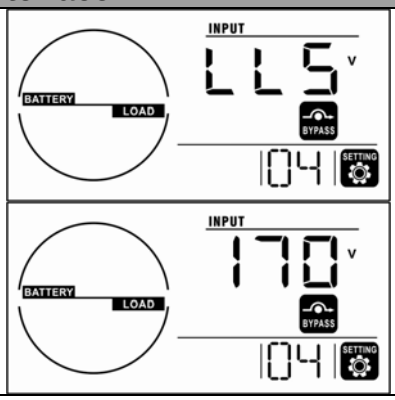
- **02: Converter mode enable/disable**

Interface	Setting
	ENA: converter mode enable DIS: converter mode disable (Default)

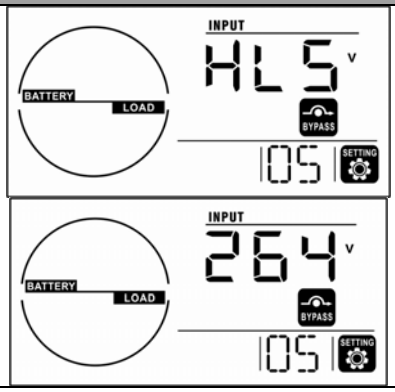
- **03: Output frequency setting**

Interface	Setting
	Output frequency can be chosen as the following: 50: output frequency 50Hz 60: output frequency 60Hz

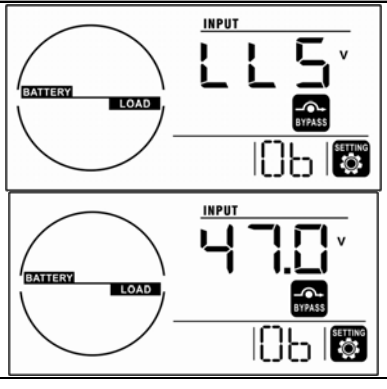
- **04: Acceptable low voltage setting in Bypass mode**

Interface	Setting
	Press Down key or Up key to set the acceptable bypass low voltage point(LLS): For 200/208/220/230/240 VAC models: 170-220: low voltage setting point from 170Vac to 220Vac (Default: 170Vac) For 100/110/115/120/127 VAC models: 85-115: low voltage setting point from 85Vac to 115Vac (Default: 85Vac)

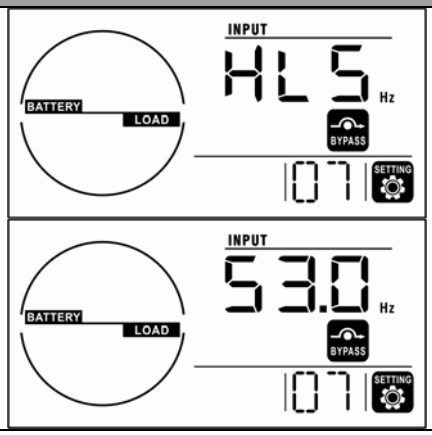
- **05: Acceptable high voltage setting in Bypass mode**

Interface	Setting
	Press Down key or Up key to set the acceptable high voltage point (HLS) in bypass mode: For 200/208/220/230/240 VAC models: 230-264: high voltage setting point from 230Vac to 264Vac (Default: 264Vac) For 100/110/115/120/127 VAC models: 120-140: high voltage setting point from 120Vac to 140Vac (Default: 132Vac)

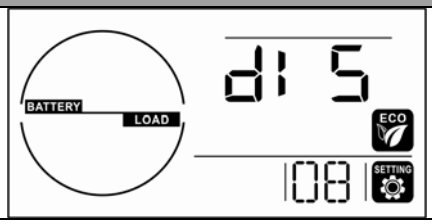
- **06: Acceptable low frequency setting in Bypass/ECO mode**

Interface	Setting
	Press the Down key or Up key to set the acceptable low frequency point (LLS) in bypass/ECO mode: For 50Hz output frequency models: 45-49Hz: low frequency setting point from 45Hz to 49HZ (Default: 47.0Hz) For 60Hz output frequency models: 55-59Hz: low frequency setting point from 55Hz to 59Hz (Default: 57.0Hz)

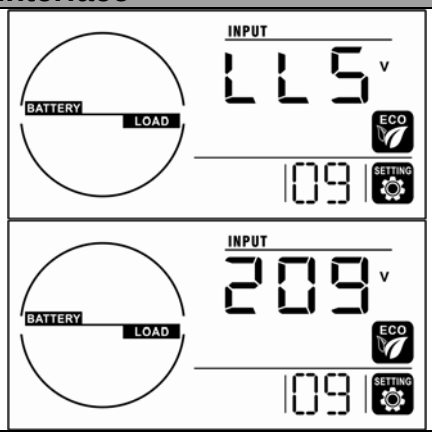
➢ **07: Acceptable high frequency setting in Bypass/ECO mode**

Interface	Setting
	Press the Down key or Up key to set acceptable high frequency point (HLS) in bypass/ECO mode: For 50Hz output frequency models: 51-55Hz: setting the frequency low loss point from 51Hz to 55HZ (Default: 53.0Hz) For 60Hz output frequency models: 61-65Hz: setting the frequency low loss point from 61Hz to 65Hz (Default: 63.0Hz)

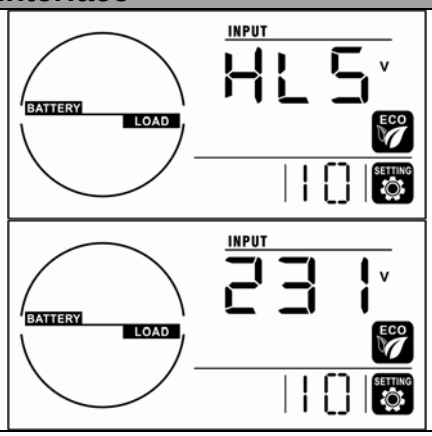
➢ **08: ECO mode enable/disable**

Interface	Setting
	ENA: ECO mode enable DIS: ECO mode disable (Default)

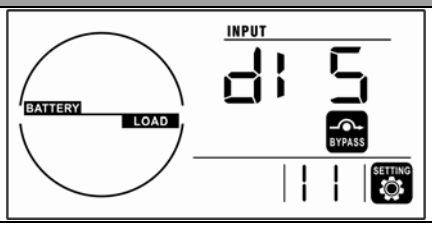
➢ **09: Acceptable low voltage setting in ECO mode**

Interface	Setting
	Press the Down key or Up key to set acceptable low voltage point (LLS) in ECO mode: For 200/208/220/230/240 VAC models, setting range is from -7V to -24V of the nominal voltage. (Default: -12V) For 100/110/115/120/127 VAC models, setting range is from -3V to -12V of the nominal voltage. (Default: -6V)

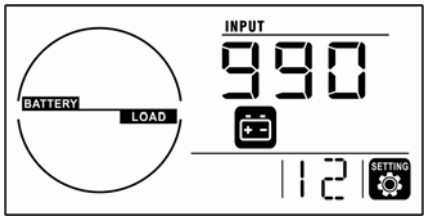
➢ **10: Acceptable high voltage setting in ECO mode**

Interface	Setting
	Press the Down key or Up key to set acceptable high voltage point (HLS) in ECO mode: For 200/208/220/230/240 VAC models, setting range is from +7V to +24V of the nominal voltage. (Default: +12V) For 100/110/115/120/127 VAC models, setting range is from +3V to +12V of the nominal voltage. (Default: +6V)

- **11: Bypass enable/disable when UPS is off**

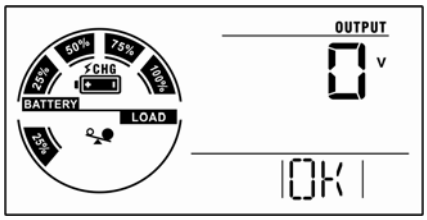
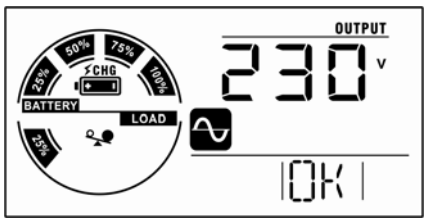
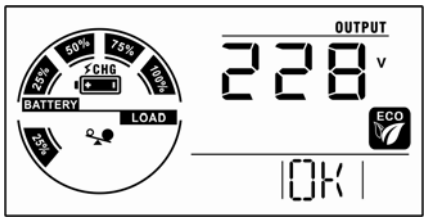
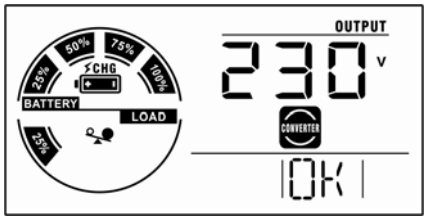
Interface	Setting
	ENA: Bypass mode is enabled when UPS is off DIS: Bypass mode is disabled when UPS is off (Default)

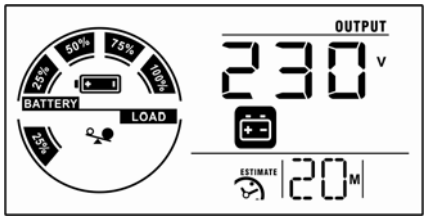
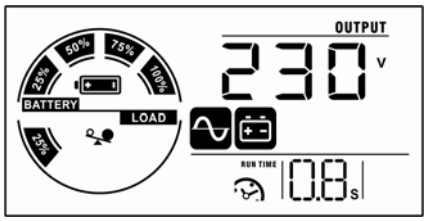
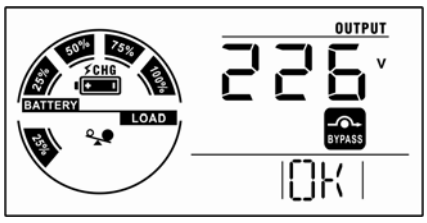
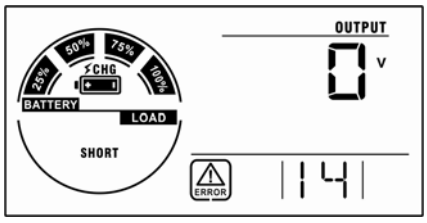
- **12: Autonomy limitation setting**

Interface	Setting
	0-999: backup time setting in minutes from 0-999 for output outlets under battery mode. 0: while setting as「0」, backup time will be on 10 seconds. 999: while setting as「999」, backup time setting will be disabled. (Default)

- **00: Exit setting**

3-6. Operating Mode Description

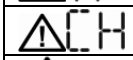
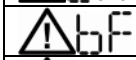
LCD display	Operating mode	Description
	Standby mode	UPS power off and no output supply power, but still can charge battery.
	Online mode	Input voltage within an acceptable range, UPS provide pure and stable AC power to output, charge the battery under online mode also.
	ECO mode	<u>Energy saving mode:</u> Input voltage within voltage regulation range, UPS will bypass voltage to output for energy saving.
	Converter mode	Input frequency within 40Hz -70Hz, UPS can be set at a constant output frequency, 50Hz - 60Hz. UPS still charge battery under this mode.

	Battery mode	Input voltage is beyond the acceptable range or power failure and alarm is sounding every 4 second, UPS will backup power from battery.
	Battery test mode	UPS will turn off charger, check if battery and DC/DC are normal.
	Bypass mode	Input voltage within acceptable range but UPS is overload, UPS will enter bypass mode or bypass mode can be set up by the front panel. Alarm is sounding every 10 second.
	Fault mode	While a fault has occurred, the ERROR icon and the fault code will be displayed.

3-7. Faults Reference Code

Fault event	Fault code	Icon
Bus start fails	01	x
Bus over	02	x
Bus under	03	x
Bus unbalance	04	x
Bus short-circuited	05	x
Inverter soft start fails	11	x
Inverter voltage is high	12	x
Inverter voltage is low	13	x
Inverter output short-circuited	14	SHORT
Battery voltage is too high	27	x
Battery voltage is too low	28	x
Over temperature	41	x
Over load	43	OVER

3-8. Warning indicator

Icon (flashing)	Warning	Alarm
	Low Battery	Sounding every second
	Overload	Sounding twice every second
	Battery is not connected or Battery Replace	Sounding every second
	Over Charge	Sounding every second
	Over temperature	Sounding every second
	Charger failure	Sounding every second
	Battery fault	Sounding every second
	Out of bypass voltage range	Sounding every second
	Bypass frequency unstable	Sounding every second
	EEPROM error	Sounding every second

4. Troubleshooting

If the UPS system does not operate correctly, please solve the problem by using the table below.

Symptom	Possible cause	Remedy
No indication and alarm even the main is normal.	AC input power is not Connected well.	Check if input power cord firmly connected to the mains.
	AC input is connected to the UPS output.	Plug AC input power cord to AC input correctly.
The icon ⚠ and 🔋 REPLACE flashing on LCD display and alarm is sounding every second.	External or internal battery is incorrectly connected.	Check if all batteries are connected well.
Fault code is shown as 27 and alarm is continuously sounding.	Battery voltage is too high or the charger is fault.	Contact your dealer.
Fault code is shown as 28 and alarm is continuously sounding.	Battery voltage is too low or the charger is fault.	Contact your dealer.
The icon ⚠ and OVER is flashing on LCD display and alarm is sounding twice every second.	UPS overload	Remove excess loads from UPS output.
	UPS is overloaded. Devices connected to the UPS are fed directly by the electrical network via the Bypass.	Remove excess loads from UPS output.
	After repetitive overloads, the UPS is locked in the Bypass mode. Connected devices are fed directly by the mains.	Remove excess loads from UPS output first. Then shut down the UPS then restart it.
Fault code is shown as 43 and The icon OVER is lighting on LCD display and alarm is continuously sounding.	UPS shut down automatically because of overload at the UPS output.	Remove excess loads from UPS output and restart it.
Fault code is shown as 14 and the icon SHORT is lighting on LCD display and alarm is continuously sounding.	UPS shut down automatically because of short circuit occurs on the UPS output.	Check output wiring and if the connected devices are in short circuit status.
Fault code are shown on the LCD display as 01, 02, 03, 04, 11, 12, 13, 41 with alarm sounding continuously.	UPS internal fault occurred. Two possible results below, 1. The load is still supplied, but directly from AC power via bypass. 2. The load is no longer supplied by power.	Contact with your dealer
Battery backup time is shorter than nominal value	Batteries are not fully charged	Charge the batteries for 5 hours at least then check capacity. If the problem still existed, consult with your dealer.
	Batteries defect	Contact with your dealer to replace the battery.
Fault code is shown as 05 on LCD display. At the same time, alarm is continuously sounding and output is cut off	UPS internal fault occurred and BUS is short circuit. UPS internal fault has	Consult with dealer. If UPS power on again before repair, the DC/DC mosfet will damage.

5. Storage and Maintenance

Operation

This UPS system contains no user-serviceable parts.

If the battery service life (3~5 years at 25°C ambient temperature) has been exceeded, the batteries must be replaced.

In this case, please contact your dealer.

Be sure to deliver the spent battery to a recycling facility or ship it to your dealer in the replacement battery packing material.

Storage

Before storing, charge the UPS 5 hours.

Store the UPS covered and upright in a cool, dry location.

During storage, recharge the battery in accordance with the following table:

Storage Temperature	Recharge Frequency	Charging Duration
-25°C - 40°C	Every 3 months	1-2 hours
40°C - 45°C	Every 2 months	1-2 hours

6. Specifications

MODEL		KO-1000 / KO-1000L	KO-2000 / KO-2000L	KO-3000 / KO-3000L
Input	Capacity	1KVA / 800KW	2KVA / 1.6KW	3KVA / 2.4KW
	Phase	Single Phase with ground		
	Nominal Voltage	200/208/220/230/240 VAC		
	Voltage Range	160VAC ~ 300VAC (100% Load)		
	Frequency	40 Hz ~ 70 Hz		
	Power Factor	≧ 0.99		
Output	Voltage Range	200/208/220/230/240 VAC		
	Frequency	Line Mode: 47 Hz ~ 53Hz or 57Hz ~ 63Hz. Battery Mode: 50Hz or 60Hz ±0.2Hz		
	Wave Form	Pure Sinewave		
	Harmonic Distortion	≦ 3% THD (Linear Load) ≦ 6% THD (Non-Linear Load)	≦ 4% THD (Linear Load) ≦ 7% THD (Non-Linear Load)	
	Overload Capacity (Line Mode)	100%~110%:10 mins; 110%~130%:1 min; >130%: 1 sec		
	Overload Capacity (Battery Mode)	100%~110%:30 sec; 110%~130%:10 sec; >130%: 1 sec		
	Auto Retransfer	After Overload Recover 100% Load		
Battery	Type	Maintenance Free Sealed Lead-Acid Battery		
	DC Voltage	36V	72V	72V
	Capacity	12V / 7.0Ah x 3 pcs	12V / 7.0Ah x 6 pcs	12V / 9.0Ah x 6 pcs
	Built-In Charger	1 A		
	Charger (Optional)	1A / 2A / 4A / 6A		
	Recharger Time	4 hours recover to 90% capacity		
	Battery Handle	Fully recharge UPS after complete discharge or every three months when storaged		
Bypass	Automatic	Overload or UPS Failure		
	Transfer Time	0 ms (<4ms Line Mode to Bypass)		
Display	LCD	UPS status, Load level, Battery level, Input/Output voltage, Discharge timer, and Fault conditions		
Audible Alarm	Battery Mode	Beep every 4 seconds		
	Battery Low	Beep every second		
	Overload	Beep twice every second		
	Fault	Beep continously		
Output	Sockets	IEC 320 x 4 PCS	IEC 320 x 8 PCS	IEC 320 x 6 PCS & Terminal
Interface	Smart RS-232 & USB	Supports Windows® 2000/2003/XP/Vista/2008, Windows® 7, Linux, Unix, and MAC		
	SNMP Card (Optional)	Power management from SNMP manager and web browser		
Network	Surge Protection	N/A		
Environment	Temperature	0℃ ~ 40℃ ; 32℉ ~104℉		
	Humidity	20-90 % RH Non-condensing		
	Acoustic Noise	Less than 45dBA at 1mt		
Net Weight	W/O Battery (Kgs)	5.5	11	11.9
	With Battery (Kgs)	12.7	24.9	27.6
Dimensions	Standard (W x H x D) mm	145*220*397	190*318*419	190*318*419
	Long (W x H x D) mm	145*220*397	190*318*419	190*318*419

* Derate capacity to 60% of capacity in Frequency converter mode and to 80% when the output voltage is adjusted to 208VAC.